

UPSTREAM STRUCTURES AND THEIR EFFECTS ON THE MAGNETOSPHERE

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Kinetic processes within the Earth's foreshock generate a profusion of plasma and magnetic field structures with sizes and durations ranging from the microscale (e.g. SLAMs, solitons, and density holes) to the mesoscale (e.g. foreshock cavities or boundaries, hot flow anomalies, and bubbles). Swept into the bow shock by the solar wind flow, the perturbations associated with these features batter the magnetosphere, driving a wide variety of magnetospheric effects, including large amplitude magnetopause motion, bursty reconnection and the generation of flux transfer events, enhanced pulsation activity within the magnetosphere, diffusion and energization of radiation belt particles, enhanced particle precipitation resulting in dayside aurora and riometer absorption, and the generation of field-aligned currents and magnetic impulse events in high-latitude ground magnetometers. This talk reviews the ever growing menagerie of structures observed upstream from the bow shock, examines their possible interrelationships, and considers their magnetospheric consequences.